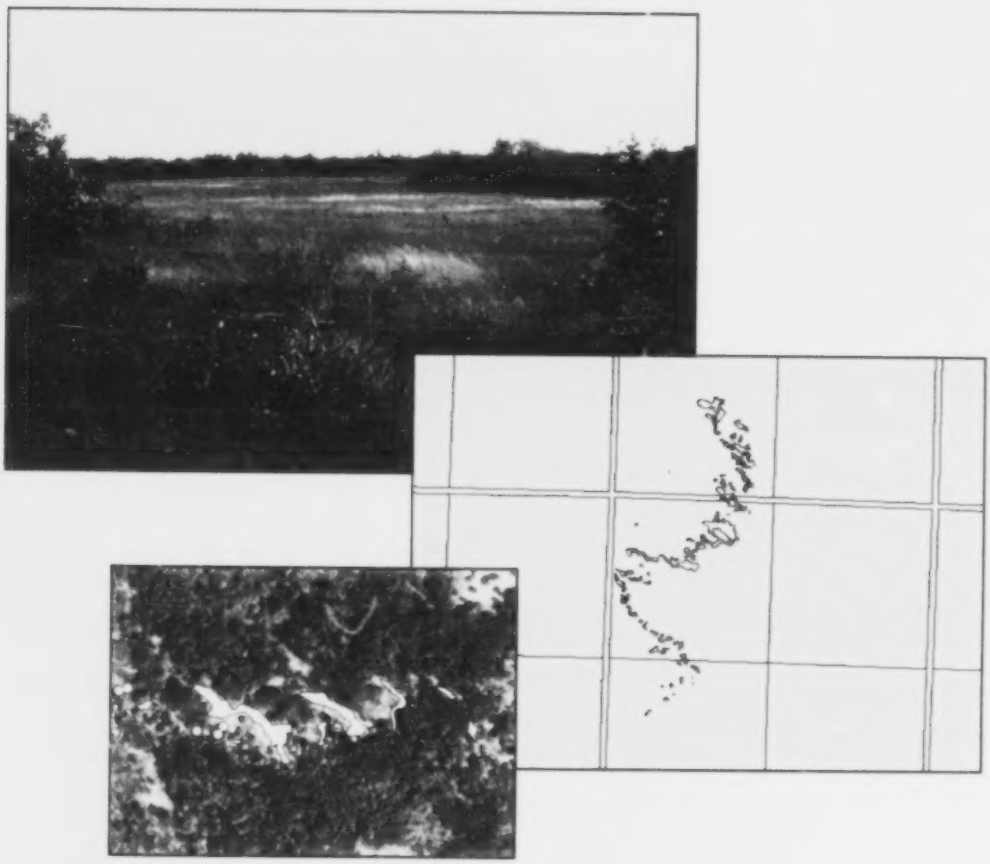
Rare Species Surveys & Stewardship Activities of the Manitoba Conservation Data Centre, 2004



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Images:

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Cover images, from top to bottom: western silvery aster habitat south of Birds Hill Provincial Park; an example of the spatial data stored in the Manitoba Conservation Data Centre's rare species database; areas occupied by western spiderwort in a portion of the Lauder Sandhills.

105-03802/

Executive Summary

Current information about rare species distribution, population abundance, and threats is essential to guiding science-based decisions related to species conservation status, protection, and recovery Through the use of field surveys and partnerships with conservation organizations and volunteers, the current knowledge of over 30 rare and uncommon species, as well as one rare plant community, was expanded in 2004.

Field surveys for rare species and communities were conducted between May 19 and October 27, 2004. Activities included monitoring known occurrences and surveying for new records. Occurrence information was also collected from volunteers responding to requests for rare species reports, and through communication with other conservation groups and individuals. Survey results for each species and community, as well as recommendations regarding future research needs and management are presented. Other rare and uncommon species that were encountered incidentally are also reported.

Targeted surveys were conducted for eight nationally rare plant species in 2004:

Culver's-root (*Veronicastrum virginicum*)

False indigo-bush (*Amorpha fruticosa*)

Foxtail muhly (*Muhlenbergia andina*)

Small white lady's-slipper (*Cypripedium candidum*)

Smooth goosefoot (*Chenopodium subglabrum*)

Swamp saxifrage (*Saxifraga pensylvanica*)

Western silvery aster (*Symphyotrichum sericeum*)

Western spiderwort (*Tradescantia occidentalis*)

These eight species are legally protected under Manitoba's *Endangered Species Act* and/or Canada's *Species at Risk Act*, or are candidates for status review and potential addition to provincial or national endangered species lists.

Additional, specialized surveys were focussed on other rare species and plant communities, including green frogs (*Rana clamitans*), rare trees of southeastern Manitoba (large-tooth aspen (*Populus grandidentata*), eastern white pine (*Pinus strobus*) and ironwood (*Ostrya virginiana*), white water-lilies (*Nymphaea* spp.) and alvar-like plant communities.

Information on habitat, precise geographic location, area of occupancy, abundance and threats to populations was collected at all survey sites, and entered in the Manitoba Conservation Data Centre's rare species mapping database. Major threats to biodiversity observed in 2004 included habitat loss, invasive species, woody encroachment into grasslands, road maintenance activities, gravel extraction, and insect and deer browsing.

A large proportion of rare species populations occur on lands owned or managed by private individuals or rural municipalities. The actions of these land stewards have critical bearing on the survival of Manitoba's rare species. Developing and implementing management plans in co-operation with local land stewards will have the greatest benefit for Manitoba's rare and uncommon biodiversity.

Acknowledgements

This work was made possible through the financial support of the Habitat Stewardship Program of Environment Canada, the Manitoba Special Conservation Fund, and the Wildlife and Ecosystem Protection Branch of Manitoba Conservation. The Critical Wildlife Habitat Program of the Manitoba Habitat Heritage Corporation provided invaluable logistical support.

Many Manitoba Conservation associates provided valuable advice and/or field assistance, including Jason Greenall, Sandi Faber, Marilena Kowalchuk, Peggy Westhorpe, Ken De Smet, Laura Murray, Gillian Stangl, Bill Watkins, Dave Roberts, Tom Moran, and Dan Chranowski. Peter Taylor provided advice regarding green frog surveys. A number of individuals helped identify possible alvar-like plant communities in the south Interlake, including Richard Caners of the University of Alberta, Elizabeth Punter of the University of Manitoba, and Paul Gregory and Dwight Nahuliak of Interlake Forage Seeds Ltd. George Douglas, formerly of the British Columbia Conservation Data Centre, Jennifer Penny also of the BC CDC, Wybo Vanderschuit of Parks Canada, Mae Elsinger of the Prairie Farm Rehabilitation Administration's Range Management division, Lynn Black and Gisele Mitrow of DOA herbarium and Steve Porter of Saskatchewan's CDC provided information on foxtail muhly. Councillor Lawrence Henry of Roseau River Anishinaabe Nation provided advice regarding western silvery aster surveys within Roseau Rapids Reserve.

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Introduction

The principal function of Manitoba's Conservation Data Centre (CDC) is to collect, manage and provide information for the conservation of Manitoba's natural biodiversity. Information on range, abundance, and threats to rare species is collected and managed using standardized, science-based methods. The information maintained by the CDC is used to assess the conservation status of Manitoba's species, as well as for conservation planning, natural resource management, and environmental impact assessments.

The primary goal of surveys in 2004 was to increase knowledge of the current status and distribution of select nationally rare plant species. Species targeted for surveys were selected and prioritised by global, national, and provincial ranks, as determined by NatureServe (2005) and the CDC. Species listed by (or candidates for examination by) the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the federal *Species at Risk Act* (SARA) or the Manitoba *Endangered Species Act* (MESA) were given a higher priority. Species that have not been documented recently were considered higher priorities than species that had been surveyed extensively in recent years. In addition to surveys for nationally rare plant species, a limited number of provincially rare species and plant communities were targeted for surveys as well.

Numerous conservation organizations and individuals conduct field surveys and stewardship activities related to rare species in Manitoba. Through field work coordination, sharing of information, and technical support, ongoing cooperation was a complementary objective of the CDC's activities in 2004. An additional objective was to develop extension materials that would encourage the public to report sightings of certain provincially rare plant species in south eastern Manitoba.

The CDC recently upgraded its rare species tracking and mapping software to a more powerful and versatile database and geographic information system. Whereas the previous system represented rare species populations as points, the upgraded system and associated data management methodology allow for polygon-based mapping that can take into account differing areas of density, exclude inappropriate habitat, and allow local range contractions and expansions to be monitored. As current data are upgraded to reflect these new capacities, the ability to monitor the status of Manitoba's rare species populations and to provide accurate location information is vastly improved. Data collection and mapping was further enhanced in 2004 by using hand-held computers with mapping software and GPS receivers. This allowed surveyors to access aerial photos and portions of the CDC's database in the field while searching for sites or mapping occurrences.

Methods

Known and potential sites to be surveyed were identified using the CDC database, herbarium records, aerial photos, Landsat satellite imagery, and topographic, surficial geology and soil maps. Species phenology and the geographic location of targeted survey sites were considered when scheduling field activities. Prior to surveys on private or otherwise restricted land, landowners or land managers were contacted by mail or telephone to request permission to access their property. While surveys focussed on rare plant species, information on other rare and uncommon plant and animal species was collected on an opportunistic basis.

Surveys were conducted between May 19 and October 27, 2004. The following information was collected for each rare species occurrence: area of occupancy, population abundance and density, reproductive status, population health, landscape context, sustaining ecological processes, associated native and exotic species, habitat preferences (slope, aspect, soil and light), threats, and management and protection comments. A voucher specimen was collected for the University of Manitoba Herbarium or the herbarium at the Manitoba Museum when identification confirmation was required and rare plant populations were large enough to allow it. Alternatively, photographs were taken.

All information was recorded on standard data sheets in the field, and patch boundaries mapped with GPS-equipped hand held computers. Following surveys, updated and newly mapped occurrences were imported to Biotics Mapper, an Arcview-based Geographic Information System. Associated information was entered in Biotics Tracker, an Oracle-based database. Areas searched unsuccessfully were recorded in a negative results database. Results of surveys conducted on managed lands (i.e. private lands, Community Pastures, WMAs, Parks) were sent to land managers.

Results

Results are presented in four sections. The first highlights results of surveys for eight nationally rare plant species. Brief notes on surveys of other rare species, largely those encountered incidentally, are included in the second section. The third section outlines special survey and communication projects, while the last section describes some of the CDC's conservation partnerships. A summary of the results is presented in Table 1. In an effort to maintain the security of rare species populations and the confidentiality of landowners, only general location information is presented. Requests for detailed location information are considered on a case by case basis by the CDC's information manager.

Table 1. Summary of 2004 rare species and plant community survey results.

Common Name	Scientific Name	Listed by the MB ESA or SARA*	Sites Surveyed**	Private Land Parcels Surveyed	Known Populations Monitored	New Populations Documented	Source Features Digitized***
Targeted Surveys for Nationally Rare Species							
Culver's root	*Veronicastrum virginicum*	✓	7		5	1	5
False indigo	*Amorpha fruticosa*		2		1	1	7
Foxtail muhly	*Muhlenbergia andina*		10		4		
Small white lady's-slippers	*Cypripedium candidum*	✓	10	3	5		8
Smooth goosefoot	*Chenopodium subglabrum*	✓	2	2		1	3
Swamp saxifrage	*Saxifraga pennsylvanica*		1			1	1
Western silvery aster	*Symphyotrichum sericeum*	✓	13	6	7		28
Western spiderwort	*Tradescantia occidentalis*	✓	10	7	3		235
Other Rare Species Surveyed							
Canada wild-ginger	*Asarum canadense*		2	2		1	3
Dutchman's breeches	*Dicentra cucullaria*		2	2			
Eastern yellow stargrass	*Hypoxis hirsuta*		3	1		3	3
Hackberry	*Celtis occidentalis*		2	1	2		10
Louisiana broomrape	*Orobanche ludoviciana*		1	1		1	1
Narrow-leaved puccoon	*Lithospermum incisum*		2			2	2
Prairie redroot	*Ceanothus herbaceus*		1			1	7
Prairie skink	*Eumeces septentrionalis*	✓	1			1	1
Sand bluestem	*Andropogon hallii*		6	4	1		1
Sensitive fern	*Onoclea sensibilis*		1			1	1
Sessile-leaf bellwort	*Uvularia sessilifolia*		2	2			2
Side-oats grama	*Bouteloua curtipendula*		5		1	1	5
Smooth green snake	*Liochlorophis vernalis*		1			1	1
Sprague's pipit	*Anthus spragueii*	✓	2			2	2
Special Survey Initiatives							
Alvar-like plant communities****			12	1		5	
Eastern white pine	*Pinus strobus*		1			1	4
Green frog	*Rana clamitans*		27				
Ironwood	*Ostrya virginiana*		3				
Large-tooth aspen	*Populus grandidentata*		5		2	2	7
Mink frog	*Rana septentrionalis*		27		1	2	3
Porter's chess	*Bromus porteri*		1			1	1
Purple locoweed	*Oxytropis lambertii*		1			1	1
White water-lilies	*Nymphaea spp.*		27				
Totals							
33	**33**	**7**	**97**	**19**	**32**	**30**	**342**

* MB ESA=Endangered Species Act, SARA=Canada's Species at Risk Act

** Sites are defined as discrete sampling locations. A single quarter-section was considered one site, unless fragmented by multiple ownership. Each owner unit within a single quarter-section was considered a separate site. On large crown parcels covering many sections, each discrete 'stop' is was considered a site. When species were not observed, site information was entered in a negative results database.

***Includes features created or modified based on 2004 field work, as well as other conspecific features updated to current data standards in 2004.

****Due to uncertainty regarding community classification, alvar-like plant communities have not been digitized in the CDC's rare species database.

Part 1: Targeted Surveys For Nationally Rare Plants

Culver's-root (*Veronicastrum virginicum*)

G4, N2, S1

Culver's-Root (family Scrophulariaceae) is a tall perennial, occasionally growing to a height of 2 m. The leaves are spaced along the stem in whorls of three to nine. They are lance-shaped with sharply toothed edges. The small white-to-pinkish tubular flowers have two protruding anthers and are crowded on a slender, spike-like inflorescence from 5-20 cm long. Culver's-root blooms from July to August.

Culver's-root ranges from Manitoba south to Texas and eastwards to the coast (NatureServe 2005). It is rare or uncommon in many of the jurisdictions in which it grows. In Canada it grows in Manitoba and Ontario where it is also rare. Culver's-root grows at the edges of thickets and aspen/bur oak woodlands in small open areas. It prefers moist, sandy, calcareous loam soils (Punter 1999). Several populations are in ditches along roadsides.

Status & Threats

Culver's-root was listed as Threatened under the Manitoba *Endangered Species Act* in 2001. Although in Canada it only occurs in Manitoba and Ontario, it is considered apparently secure in the United States and Globally (NatureServe 2005).

Apart from one disjunct occurrence near Kleefeld, the range of Culver's-root in Manitoba is less than 400 square km (Fig. 1). Within this area it occurs in and around the Tall Grass Prairie Preserve, and in the Rural Municipality (RM) of Franklin. Most populations within the RM of Franklin occur along road allowances and are threatened by road maintenance activities such as cutting or spraying, and ditch maintenance. In addition, habitat loss due to removal of hedgerows and shelterbelts may threaten Culver's-root (Punter 1999). Browsing of flowering stems has also been observed.

Data collected in 2004

Five of the seven previously known occurrences within the RM of Franklin were updated on July 28, and one new occurrence was discovered. Culver's-root was extirpated from two sites following vegetation removal from a cemetery and removal of a rail-bed in 1998. However, it does occur adjacent to the cemetery and rail-bed sites. In 2002, 20 stems were found growing in the ditch adjacent to the cemetery but no Culver's-root was found adjacent to the rail-bed site. In 2004, 195 stems were counted in the ditch adjacent to the cemetery, and 41 stems were counted in the ditch adjacent to the rail-bed site. In addition, one new patch containing only 6 stems was found in the ditch between the above two sites. Each of these three occurrences is separated by at least 2 km. Another small roadside patch approximately 1 km to the north,

which contained 17 and 16 stems in 1997 and 2002 respectively, contained no Culver's-root in 2004.

A roadside occurrence of at least 1000 plants surrounding a section was discovered in 2003. This occurrence was extended in 2004 to include an additional patch of 338 stems just under 1 km to the west. Since 2003, the ditch along the northeast quarter of the original occurrence has been fenced in up to the road edge encompassing the ditch. No Culver's-root was seen inside this fence in 2004. Of the 138 stems in the new patch 26 had been browsed. Another previously known occurrence adjacent to Roseau Rapids First Nation was found to contain at least 105 stems on private property and in the adjacent road allowance, an increase from 1998 when 58 stems were counted.

Recommendations

Future Research

Two other occurrences in the RM of Franklin, one discovered in 1999 along a road allowance and one discovered in 1998 on private land, were not visited in 2004. These sites should be resurveyed to determine if Culver's-root is still there. Further searches on private land and within Roseau Rapids First Nation may reveal previously unknown occurrences. The most northerly occurrence, near Kleefeld, was not found to support any Culver's-root when last surveyed in 2002 and should be revisited. Further information about limiting factors of Culver's-root in Manitoba is required (Punter 1999).

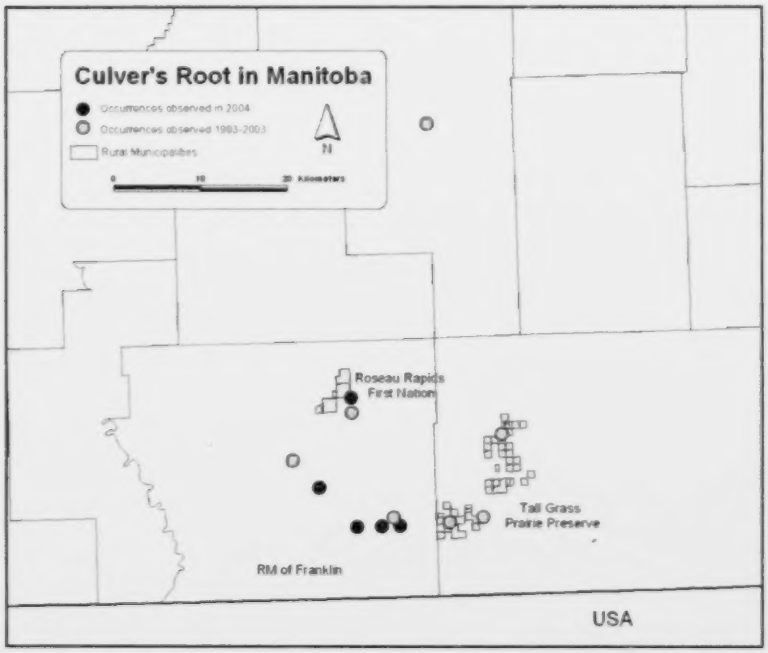

Figure 1. The distribution of Culver's-root (*Veronicastrum virginicum*) in Manitoba.

Management

Due to the high proportion of roadside occurrences within the RM of Franklin, those responsible for road maintenance should be notified. Adjacent landowners should also be contacted as removal of hedgerows and shelterbelts may contribute to habitat loss. Information on Culver's-root is being provided to Roseau Rapids First Nation. A Species at Risk fact sheet for this species has been drafted for production in 2005/2006.

False Indigo-bush (*Amorpha fruticosa*)

G5, N1N2, S1S2

False indigo-bush (family Fabaceae) is a native, deciduous shrub growing to between two and five metres high. The leaves are 38 to 100 cm long, with eleven to twenty-five oval leaflets (Looman and Best 1987). Pubescence is highly variable (Gleason and Cronquist 1991). The purplish-blue scented flowers appear in June and occur in spike-like racemes up to 20 cm long (Looman and Best 1987). The fruits are pods up to 9 mm long (Gleason and Cronquist 1991), with conspicuous brown glandular spots (Boivin 1967).

False indigo-bush is commonly found in moist woods and along streambanks (Gleason and Cronquist 1991). This species occurs in every state in the continental US except Nevada, Montana, and Alaska. Within Canada, the species is found in Manitoba, Ontario, Quebec, and New Brunswick (NatureServe 2005). Populations in eastern Canada are escaped ornamentals (Scoggan 1978) and the species is considered exotic in New Burnswick (NatureServe 2005).

Status & Threats

False indigo-bush is ranked S1S2 in Manitoba and is ranked S1 in Ontario (the only other Canadian jurisdiction where it naturally occurs). Populations occur along the Red River from Morris to Selkirk (Scoggan 1957), and are normally within 100 m of the water's edge. Populations have also been reported adjacent to the Roseau and Whitemouth Rivers. Many populations surveyed in 2002 were subject to intense insect browse resulting in severe defoliation (Reimer and Hamel 2003). The presence of many populations in road allowances subjects them to threats related to the maintenance or development of these areas. The availability of riparian habitat along the Red River may be limiting to this species. Riparian habitat has been lost to increasing urbanization, suburbanization, agricultural development and riverbank stabilization projects.

Data Collected in 2004

Two false indigo-bush populations were surveyed on July 6, 2004 (Fig. 2). Surveys of a previously known occurrence at the newly-created Tom and Jennifer Shay Ecological Reserve south of St. Adolphe resulted in the spatial delimitation of five discrete shrub patches. The population appeared to be in poor condition as significant defoliation and die-back was observed. An unidentified caterpillar species was observed feeding on the leaves, and in many cases defoliating entire shrubs.

A second, previously unrecorded, occurrence was observed approximately 4 km north in a road allowance near the Red River. Shrubs appeared to be in fairly good condition. Vegetation in the road allowance was characterized by non-native grasses such as brome (*Bromus inermis*). The presence of false indigo-bush in disturbed areas indicates that it is at least somewhat tolerant of disturbance. This population could be negatively affected by road maintenance activities, however.

Recommendations

Future Research

Research is required to identify the major insect browsers of false indigo-bush, and to determine the impact of this herbivory on population health and viability. Monitoring of known populations should focus on delimiting their spatial extent and quantifying adjacent land uses and threats. Known populations along the Roseau and Whitemouth Rivers should be surveyed in combination with searches for new occurrences. The status and extent of historically recorded populations within the City of Winnipeg limits should be assessed.

Management

Provincial and/or municipal maintenance staff should be made aware of the location of false indigo-bush and other rare species in road allowances. If insect browsers are found to be jeopardizing long-term population viability, insect control may be required. Proposed riverbank development or stabilization projects should consider effects on false indigo populations, and include plans for minimal disturbance or restoration.

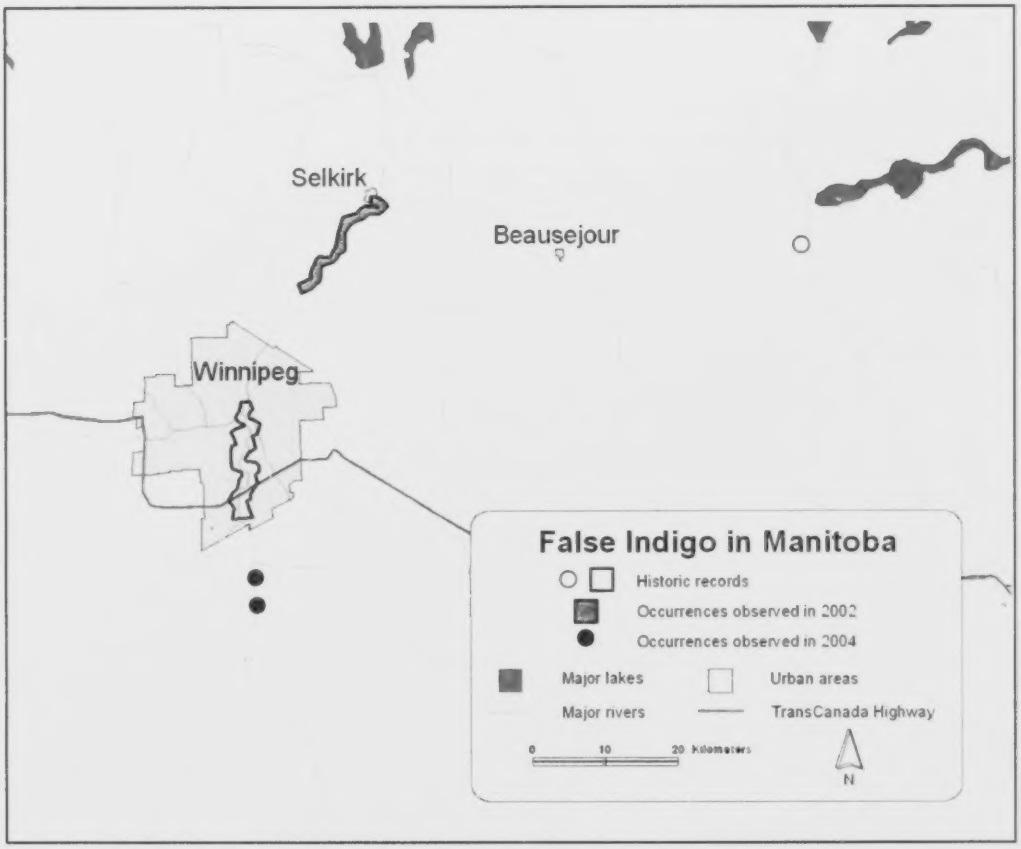

Figure 2. The distribution of false indigo-bush (*Amorpha fruticosa*) in Manitoba.

Foxtail Muhly *(Muhlenbergia andina)*

G4, N1, S1

Foxtail muhly (family Poaceae) is a rhizomatous perennial grass with stems reaching 25 to 85 cm. The flat leaves are 4 to 16 cm long and 2 to 6 mm wide. The inflorescence is a contracted branching panicle 2 to 15 cm long and 0.5 to 2.8 cm wide. Each flower spikelet is 2 to 4 mm long. Glumes (outer bracts of the spikelet) are sharply pointed but lack an extended awn (bristle). The tip of the lemma (bract inside glumes) may have an awn up to 1cm long. The lemma is surrounded by hairs that equal the length of the lemma. (Flora of North America Editorial Committee 2003). Flowering occurs in late summer. The characteristics that separate foxtail muhly from similar species are the long hairs that equal the length of the lemma, an awn tipped lemma, and glumes without awns.

USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. Illustrated flora of the northern states and Canada. Vol. 1: 187.

In Manitoba foxtail muhly has been collected in calcareous areas from three lakeshores and one wet pasture.

Status & Threats

Foxtail muhly is not considered common in any Canadian jurisdiction where it occurs. However, it is widespread and NatureServe (2005) considers it to be globally secure. It grows from Texas north to Canada. In Canada it is known from one location in British Columbia, one location in Saskatchewan and four locations in Manitoba. A status report is currently being prepared for consideration by COSEWIC.

In Manitoba foxtail muhly has been collected from lakeshores in Riding Mountain National Park, Duck Mountain Provincial Park and Lake Manitoba Narrows, as well as a wet pasture north of Duck Mountain near the town of Birch River (Fig. 3). Possible threats include recreational and agricultural activities, and road allowance maintenance along the Lake Manitoba Narrows bridge.

Data Collected in 2004

Surveys for known and potential occurrences of foxtail muhly were conducted in response to a request for updated information for a COSEWIC status report.

Foxtail muhly was collected from a gravelly shore at Clear Lake, Riding Mountain National Park in 1941. On August 17, 2004 areas along the shoreline of Clear Lake were searched. Surveys included the shoreline from the boat launch west of Wasagaming to the sand spit separating Clear Lake from South Lake. Surveys also included five other road-accessible shoreline areas on the north and south sides of Clear Lake. No foxtail muhly was found.

Foxtail muhly was first collected from a moist rocky beach at Laurie Lake, Duck Mountain Provincial Park by Looman (1973) where it was reported to be very abundant. It was collected again in 1990 from an exposed rocky lakeshore at Laurie Lake. On August 18, 2004 approximately 1 km of shoreline along the north and east portions of Laurie Lake was searched. No foxtail muhly was found.

Foxtail muhly was also collected by Looman (1973) from a wet area in a shallow depression within Birch River Community Pasture where it was uncommon. On August 18, 2004 both the southern and northern portions of the Community Pasture were searched. Wet depressions were fairly common but no foxtail muhly was found.

Foxtail muhly was collected from Lake Manitoba Narrows in 1985 with very specific directions. On August 6 and 19, 2004, Lake Manitoba Narrows was searched. The entire area where it may have been collected from was searched but no foxtail muhly was found and the specific habitat described on the herbarium label was not observed. Provincial Highways Department staff were mowing the area on August 19. The area had also been mowed prior to a site visit on September 22, 2003.

Lake Manitoba Narrows

Portions of the shoreline of Bell and Steeprock Lakes, in Porcupine Provincial Forest, were also searched on August 19. However, the shorelines of these lakes are characterised by an abrupt shift from forested upland to open water, with little or no intervening mineral beach area.

Researchers in Riding Mountain National Park and Duck Mountain Provincial Park were also asked to report sightings of foxtail muhly in 2004. One report was received from Riding Mountain National Park. However, the specimen collected was bluejoint (*Calamagrostis canadensis*). Both bluejoint and northern reed grass (*Calamagrostis stricta*) in particular have some characteristics in common with foxtail muhly, such as long hairs equalling the length of the lemma and awnless glumes. However, in *Calamagrostis* the awn is attached at the back of the lemma rather than the tip. No species from the genus *Muhlenbergia* were found at the sites searched in 2004.

Recommendations

Future Research

In British Columbia, foxtail muhly grows on calcareous tufa from mineral hot springs with some active seepage. Soil development is minimal and it is believed that the tufa has likely formed over the last decade. In Saskatchewan, the species has been found on a damp, limey, gravelly beach where the vegetation was typical of calcareous groundwater bogs, without any truly boggy soil (Hudson 1988). Hudson (1988) suggests that a lowering of the lake level may have occurred within the past 50 or 60 years giving more of a gradient for groundwater seepage.

In Manitoba, the Laurie Lake and Birch River Community Pasture sites were described by Looman (1973) as somewhat saline. The shoreline of Laurie Lake is characterised by a broad, gently sloping gravelly apron surrounded by tamarack, white spruce and balsam poplar. The presence of small trees apparently colonizing the gravelly apron around the

lake, with mature trees farther away from the shoreline, indicates that the water level of Laurie Lake may have dropped in recent history. The presence of Kalm's lobelia (*Lobelia kalmii*) and grass of parnassus (*Parnassia palustris*) indicates calcareous seepage at this site as well. It is possible that foxtail muhly still occurs somewhere along this shoreline as populations consist of widely scattered small colonies (Pohl 1969). Surveys using a boat to access more remote areas of the shoreline could potentially lead to the rediscovery of foxtail muhly at this site. According to locals, no other lakes in Duck Mountain Provincial Park have shoreline habitat characteristics similar to that of Laurie Lake.

Birch River Community Pasture and the shoreline of Clear Lake are large areas and foxtail muhly should not be presumed extirpated from these sites. Grass of parnassus was also observed at one site along Clear Lake. Foxtail muhly may have been extirpated from Lake Manitoba Narrows by road allowance maintenance activities.

Foxtail muhly is similar to other species within the genus *Muhlenbergia* and has been reported to hybridize with marsh muhly (*Muhlenbergia glomerata*) in Montana (Pohl 1969). Herbarium specimens of bog muhly (*Muhlenbergia glomerata*) and marsh muhly (*Muhlenbergia racemosa*) should be reviewed to check for misidentified specimens of foxtail muhly.

Management

In the absence of information about the current status of this species in Manitoba, destruction of habitat at the four known locations should be avoided. Dramatic lake water level changes may impact shoreline populations.

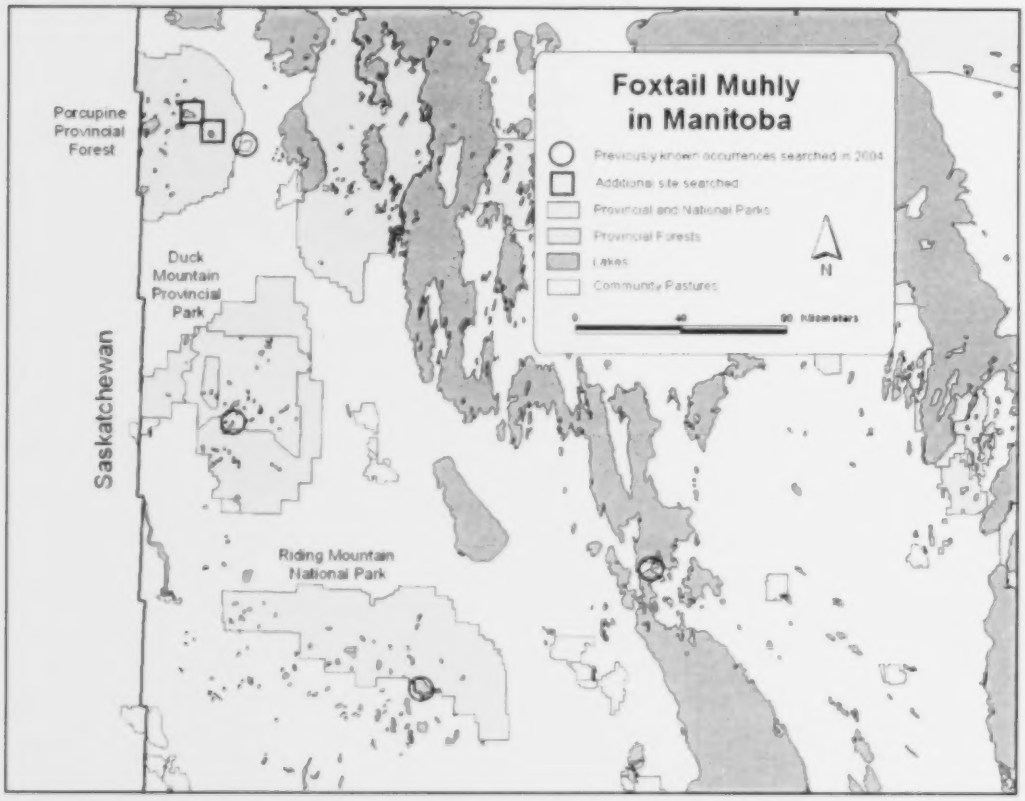

Figure 3. The distribution of foxtail muhly (*Muhlenbergia andina*) in Manitoba.

Small White Lady's-slipper (*Cypripedium candidum*)

G4, N2, S1

Small white lady's-slipper (family Orchidaceae) is a herbaceous perennial that grows to a height of 10 to 35 cm. Plants grow in clumps of few to many stems, each with two to four leaves. Flowers consist of a small (less than 2.5 cm long) white pouch-shaped "slipper" with purplish veins or spots particularly inside. The surrounding twisted, greenish-yellow petals and sepals are often streaked or spotted with purple. Flowering usually occurs between mid May and mid June but varies with spring weather.

Small white lady's-slipper is rare or uncommon throughout its range from Ontario and Manitoba south to Alabama and has been extirpated from at least two jurisdictions (NatureServe 2005). In Manitoba, small white lady's-slipper grows in moist calcareous prairies and openings in wooded grasslands. It prefers relatively undisturbed grassland, but can also grow in disturbed sites such as roadside ditches (Manitoba Conservation 2000).

Status & Threats

Small white lady's-slipper is listed as Endangered under the Manitoba *Endangered Species Act* and the Ontario *Endangered Species Act*. The species has is also listed as Endangered under Canada's *Species at Risk Act*. Small white lady's-slipper is considered rare or uncommon throughout its range but overall is considered apparently secure in the United States and globally by NatureServe (2005).

Small white lady's-slipper occurs in three main areas of the province: south of Brandon, the southern Interlake region, and from Kleefeld south to the Tall Grass Prairie Preserve (Fig. 4). Most of the Brandon and Interlake populations occur on private land or provincial road allowances maintained by rural municipalities. Staff at the Tall Grass Prairie Preserve monitor and report on populations at the preserve annually.

Threats to small white lady's-slipper include encroachment of woody species, late spring frosts, illegal collection of plants, spraying of herbicides and clearing of ditches, weedy species invasion, urbanization, hybridization with yellow lady's-slipper, and conversion of native prairie to agricultural land (Manitoba Conservation 2000). Populations south of Brandon are at greatest risk from anthropogenic disturbances (Hughes 2001).

Data Collected in 2004

Previously known small white lady's-slipper sites south of Brandon were surveyed on June 9 and 16. No small white lady's-slipper flowers were observed on June 9. Several unidentified vegetative clumps and one flowering hybrid were observed at a site owned by the RM of Cornwallis. Yellow lady's-slipper, small white lady's-slipper and hybrids between the two are known to occur at this site. Numbers of small white lady's-slipper at this site appear to have been declining over the past several years. In 1998, 298 stems were estimated and in 2001 only 40 flowering stems were found. Contributing factors to declining numbers include frost damage, fluctuations in precipitation, hybridization, and encroachment of woody vegetation and weeds.

No lady's-slippers were found at two privately owned sites on June 9. One of these sites had an estimate of 322 total stems in 2001 and only one flowering stem seen in 2002. Damage to turf by horse's hooves and leafy spurge (*Euphorbia esula*) are threats at this site. Yellow stargrass (*Hypoxis hirsuta*), an uncommon species often found growing with small white lady's-slipper was still present at this site. At the other privately owned site three clumps of small white lady's-slipper had been observed in 1997 but were not found during searches in either 2001 or 2004. The site was comparatively wet with shrubby growth in areas. In the road allowance to the north, ten flowering stems were observed in 1998 and two were observed in 2000 along with many yellow lady's-slippers. In 2004, several clumps of yellow lady's-slipper and a few hybrids were seen but no small white lady's-slippers were found.

No lady's-slippers were flowering on June 9 at the Crown land site managed by Manitoba Conservation. However, many yellow, hybrid and small white lady's-slippers were counted at this site on June 16. Estimates of small white lady's-slipper in 1998 and 2000 were 984 and 817 respectively. Evidence of fungal growth in 126 aborted buds was documented in 2000. In 2001 only 27 small white lady's-slipper stems were counted but hundreds of hybrids were observed along with yellow lady's-slipper. In 2004 there were at least 139 stems of small white lady's-slipper, 306 yellow lady's-slipper, 290 hybrids and 299 unidentified vegetative stems. Hybridization, thatch build-up, encroachment by woody vegetation and invasion by weedy species are threats at this site. Manitoba Conservation has been removing woody vegetation from this site since 2002. Cattle grazing was also allowed on this site for about three weeks in August 2003. Yellow stargrass also occurs at this site.

Only one other clump of small white lady's-slipper was found during surveys on June 16. It was found at a previously known road allowance site along with one hybrid and seven unknown lady's-slipper stems. Yellow stargrass was also present. No lady's-slippers were found in a wet undeveloped road allowance to the north of this site where small white lady's-slipper had previously been recorded, although yellow stargrass was present. No lady's-slippers were found at another small previously known road allowance site (4 flowering stems in 1997 and 15 stems in 1998) although a relatively uncommon species, narrow-leaved puccoon (*Lithospermum incisum*) was observed. Small white lady's-slipper at one other road allowance site was confirmed extirpated by installation of a gas pipeline in 1996.

On June 22, a previously known small white lady's-slipper population in a road allowance near Kleefeld was surveyed. 340 stems were counted. The highest estimate for this site was 683 stems in 1987. Since then this population has been subject to picking and habitat damage from fence maintenance activities. In 2004 the fenceline was sprayed with roundup. Three clumps were hit. Several hybrids were also observed 1 km north of this population.

On June 23, a site near Holland was searched following a landowner report. No orchids were observed. A subsequent conversation with the landowner lead researchers to believe that the report was based on the similar but larger showy lady's-slipper (*Cypripedium reginae*), which is also relatively uncommon.

Recommendations

Future Research

Flower buds of small white lady's-slipper are initiated in late summer of the preceding year (Bowles 1983). The low numbers of small white lady's-slipper observed in 2004 may be a response to an extremely dry summer in 2003 combined with a late spring in 2004. Although small white lady's-slipper typically flowers before yellow lady's-slipper, small white lady's-slipper was flowering at the same time or following yellow lady's-slipper in 2004, thus increasing opportunities for hybridization. Continued monitoring activities are required to document fluctuations in population sizes in response to climate, hybridization and other threats. The response of small white lady's-slipper to woody vegetation management at the Crown land site south of Brandon should be monitored annually. Population size estimates should continue to reflect stem numbers as individuals are difficult to determine due to its rhizomatous nature.

Management

As indicated by Hughes (2001), protective land ownership is often not enough to maintain small white lady's-slipper populations. In the absence of natural disturbance regimes (i.e. fire) that control competing vegetation and maintain prairie habitats, active habitat management such as controlled burning, mowing and twice-over grazing may be required to promote small white lady's-slipper survival. Removal of yellow lady's-slipper at appropriate sights should also be considered. Effective communication and follow-up with landowners and managers is needed. A National Recovery Strategy for small white lady's-slipper is expected to be produced in 2005/2006 in cooperation with Ontario.

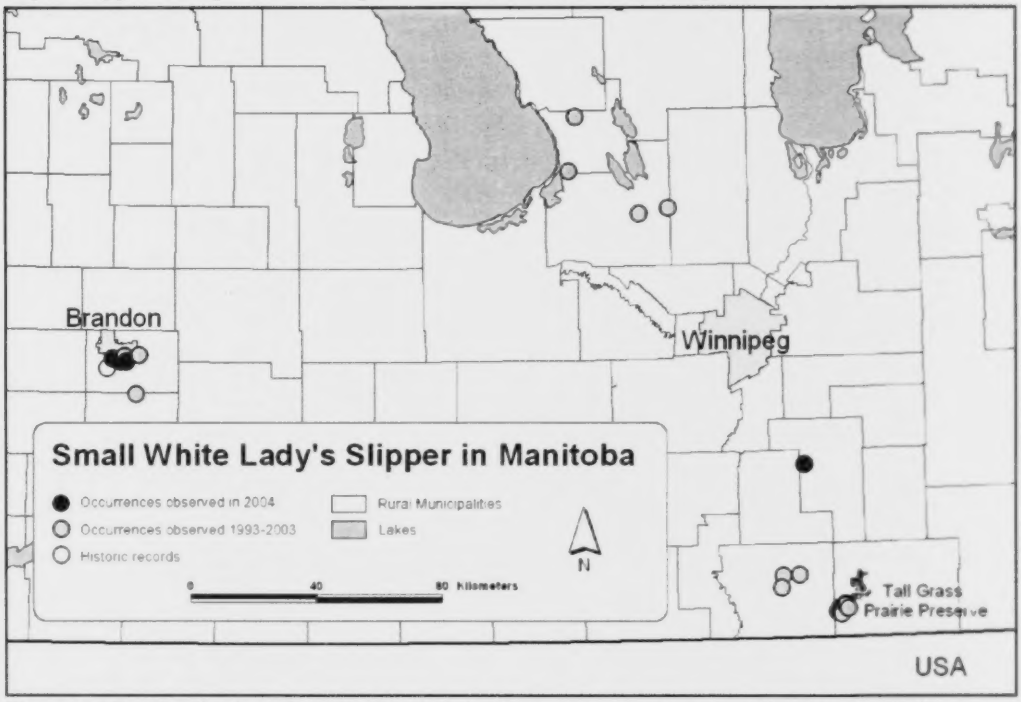

Figure 4. The distribution of small white lady's-slipper (*Cypripedium candidum*) in Manitoba.

Smooth Goosefoot (*Chenopodium subglabrum*)

G3G4, N2, S1

Smooth Goosefoot (family Chenopodiaceae) is an erect or semi-erect annual that grows to a height of 20-80 cm (Looman and Best 1987). Leaves are glabrous, fleshy, entire, linear, and 1-veined and are arranged alternately on the numerous ascending branches. The entire plant is glabrous to only sparingly mealy or powdery. The inflorescence is open and leafy, and characterised by small greenish or reddish flowers produced in small widely spaced glomerules. Flowering occurs from June to July.

This is a species of active and partially-stabilized sand dune systems. It is globally uncommon, uncommon in the United States, and rare in Canada. It is rare or very rare in all subnational jurisdictions for which status information is available (NatureServe 2005). In Manitoba, where the species is known only from the Routledge Sandhills.

Status & Threats

Smooth goosefoot is currently listed as a species of Special Concern under Canada's *Species at Risk Act* due to its rarity and the rapid decline of appropriate habitat in the Canadian prairies. It is listed on Schedule 3, as it was designated Special Concern by the Committee on the Status of Wildlife in Canada (COSEWIC) in 1992. A status reassessment using new quantitative criteria, expected to occur in May 2006, could potentially lead to legal protection under Schedule 1 of the *Species at Risk Act*. Despite periodic searches over several decades by staff of the CDC, Manitoba Museum, and University of Manitoba, the species has been observed only once since 1959.

Much of the available habitat for smooth goosefoot is invaded by leafy spurge. Other threats to this species include encroachment of shrubby vegetation, overgrazing by cattle, petroleum exploration, and off-road vehicle traffic.

Data Collected in 2004

Portions of three quarter-sections in the Routledge Sandhills were surveyed on August 23; the species was observed on one of them (Fig. 5). The open, partially-stabilised sand dunes of this area were identified as potential goosefoot habitat based on CDC surveys in 2002 (Reimer and Hamel 2003). Field work was conducted jointly with Dr. Diana Bizecki Robson of the Manitoba Museum. Dr. Bizecki Robson is the author of a forthcoming smooth goosefoot status update for COSEWIC and has conducted previous surveys for the species in the Great Sand Hills of Saskatchewan. Smooth goosefoot was observed growing intermittently along the mid and upper slopes of the sparsely vegetated west-facing slope of a sand ridge. Observations in 2004 represent the first since 1959 and only the second collection in the province. The exact location of the previous collection is not known, but it was likely from a sandhill area between Oak Lake and Routledge.

Sandhill areas of Spruce Woods Provincial Park were searched on August 25, but no smooth goosefoot was observed.

There are several possible reasons why smooth goosefoot was observed in the Routledge sandhills in 2004 but not in other years (Reimer and Hamel 2003, Bizecki Robson et al. *in press*). Firstly, individual plants and flowers are small and inconspicuous. Smooth goosefoot is similar in appearance to narrowleaf goosefoot (*C. pratericola*), which co-occurred in 2004. The shared characters of these species necessitate close examination of individual plants. Secondly, surveys may not have coincided with the species' most conspicuous phenological stages. Surveys in 2002, for example, were conducted in late July, while all individuals observed in 2004 were in flower in late August. Finally, *Chenopodium* seeds may persist in the soil for up to 40 years, remaining dormant until appropriate conditions allow for germination (Royer & Dickinson 1999).

In contrast to the summer of 2002, the 2004 growing season was unusually wet and cool. Increased smooth goosefoot numbers in Saskatchewan in 2004 may have been linked to the cool, wet summer as well (Diana Bizecki Robson, pers. comm.).

Recommendations

Future Research

Surveys of additional sandhill areas in the Oak Lake-Routledge area may result in the discovery of additional smooth goosefoot occurrences, if conducted when weather conditions are conducive to germination and growth. Other sandhill areas in southwestern Manitoba may harbour suitable habitat as well. Additional information on specific weather-related requirements for germination could help in planning future surveys. Surveyors should note that if germination requirements are not met in the season of survey, this species may be present only in the seed bank.

Management

Smooth goosefoot and associated habitat in the Routledge sandhills occurs on private land. Landowners should be encouraged to implement or continue management techniques that will help maintain open sand and grasslands. Landowners should be encouraged to work with organizations such as the Manitoba Habitat Heritage Corporation and the Mixed-grass Prairie Stewardship Program to implement these programs. Conservation agreements with landowners will help secure the continued presence of the remarkable diversity of rare and uncommon sandhill species.

Partially destabilised sand provides habitat for a number of rare species, including nationally rare sand bluestem (*Andropogon hallii*) and western spiderwort (*Tradescantia occidentalis*). The full diversity of native plants in sand hill areas can be promoted through management activities that help maintain a mosaic of open sand, grassland and wooded areas. Controlled burns and light grazing help limit the encroachment of aspen into grassland areas and, in combination with the control of leafy spurge populations, can help maintain habitat for both rare and common native species, including smooth goosefoot.

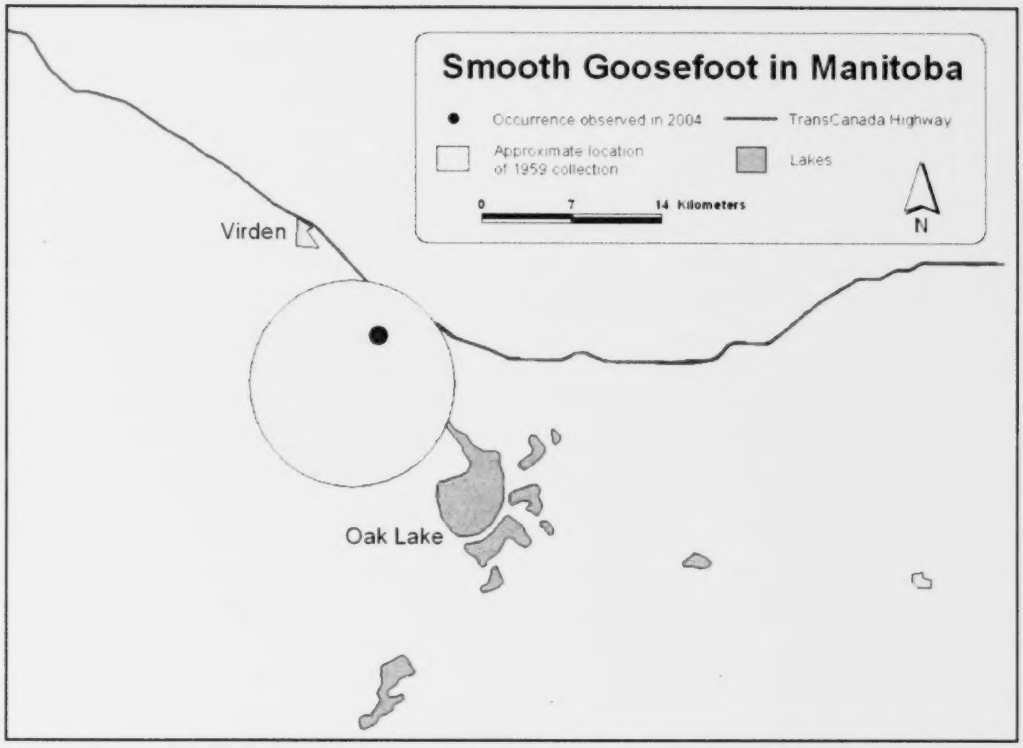

Figure 5. The distribution of smooth goosefoot (*Chenopodium subglabrum*) in Manitoba.

Swamp Saxifrage (*Saxifraga pensylvanica*)

G5, N1, S1

Swamp Saxifrage (family Saxifragaceae) is a perennial herb with a thickened rootstock, and is characterised by a basal rosette of lanceolate to broadly-elliptic leaves that are up to 20 cm long including the reddish petioles (US Department of Agriculture, no date). Flowering stems that are up to 1 m tall arise in June and support racemes of small greenish-white flowers. Fruits are a pair of beaked follicles up to 4 mm long.

The species' range is limited to the northeastern United States and adjacent areas of Ontario and southeastern Manitoba. A disjunct population occurs in east-central Saskatchewan. Across its range, the species tends to occur in wet prairies and meadows, but also in mineral-rich swamps. In Manitoba, the species is only known from the extreme southeastern corner .

Status & Threats

Swamp saxifrage is considered very rare in Canada and in the three provinces in which it occurs. Its Canadian range is limited to the extreme southeastern corner of Manitoba, the Rainy River District of Ontario, and the Pasquia Hills of Saskatchewan (Steve Porter, Saskatchewan CDC; Al Harris, Northern Bioscience, pers comms.). The species is considered a priority for preparation of a national status report for the Committee on Endangered Wildlife in Canada (COSEWIC) (Erich Haber, COSEWIC Plants Subcommittee Chair, pers. comm.).

Populations in Ontario appear to tolerate some disturbance, and have been observed growing adjacent to trails and drainage ditches (Al Harris, Northern BioScience, pers. comm.). Logging may be a threat to some Ontario populations (*ibid.*).

Data Collected in 2004

A patch (approximately 500 m^2) of swamp saxifrage was observed near the shoreline of Lake of the Woods on June 29 (Fig. 6). Several flowering stems were observed in a cedar-dominated swamp. This population was first identified based on the observation of basal leaves on June 30, 2003 but positive identification could not be made without flowering stems. Flowering stems were not observed during resurveys of the site on July 17, 2003 and June 4, 2004.

The discovery of this population represents only the second collection of the species in Manitoba, and the first observation in 32 years. The species was previously collected approximately 7 km away at Moose Lake by Looman (1973) where it was 'very sparse in a muskeg area'.

The swamp saxifrage population near Lake of the Woods appeared to be free of immediate anthropogenic threats. Moose Lake, however, has seen development as a cottage subdivision and a campground. Swamp saxifrage is a wetland species found in mineral-rich swamps. As such, the species may be impacted by

activities that alter surface or subsurface water flow. Mineral-rich swamps are not very resilient to human disturbance, and are threatened by logging (within or adjacent), invasive species, and changes in local hydrology (New Hampshire Natural Heritage Program, no date). Manitoba's Lake of the Woods shoreline is largely free of surface water-impeding human infrastructure such as roads and drains.

Swamp saxifrage

Recommendations

Future Research

The species was observed in a cedar swamp near the shoreline of Lake of the Woods. It is also known to occur in black spruce swamps in Ontario (Al Harris, Northern Bioscience, pers. comm.) and on mossy hummocks in shrub birch and willow fens in Saskatchewan (Steve Porter, Saskatchewan CDC). Similar habitat may exist in other places near the shoreline of Lake of the Woods in Manitoba, and should be surveyed. Access by land may be difficult, however, given the lack of roads or trails, thick willow and dogwood brush, and uneven terrain. Access by water may be more suitable, but would be easiest when lake levels are low; high water levels in June of 2004 meant most of the beach was underwater. Surveys of suitable habitat in the Moose Lake area should be undertaken.

Management

The potential impact of proposed drainage projects in the vicinity of Buffalo Bay should be screened for their impact on surface-water movement and swamp saxifrage populations. Swamp saxifrage locations should be provided to the Forestry Branch of Manitoba Conservation in order to aid in land use planning.

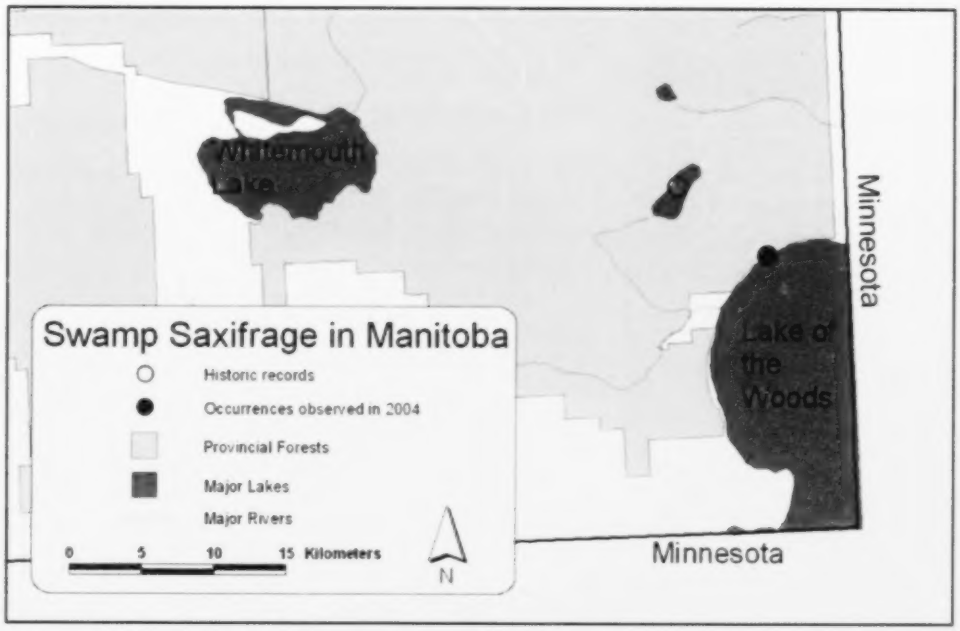

Figure 6. The distribution of swamp saxifrage (*Saxifraga pensylvanica*) in Manitoba.

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Swamp saxifrage

Recommendations

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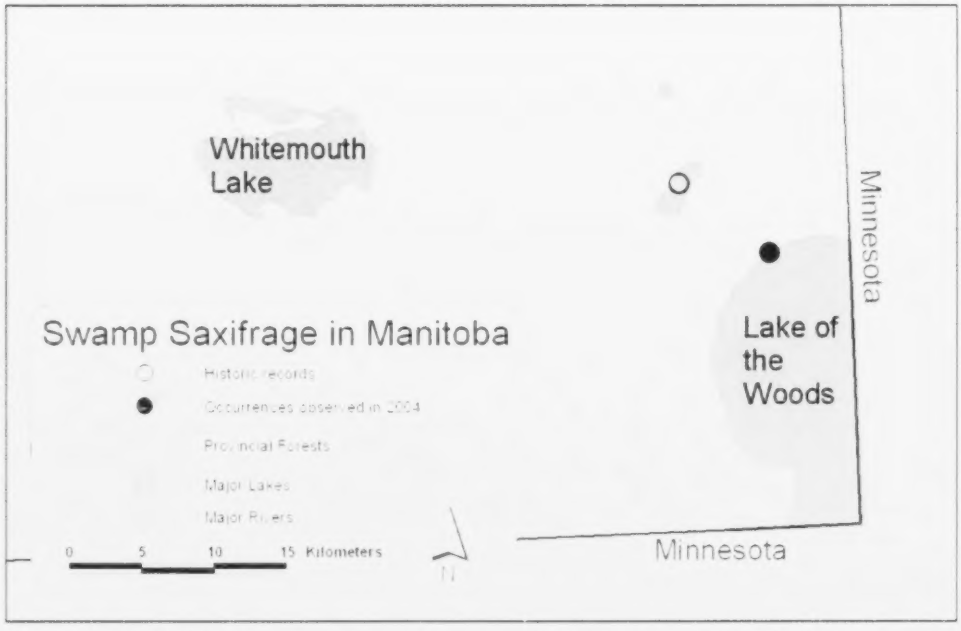
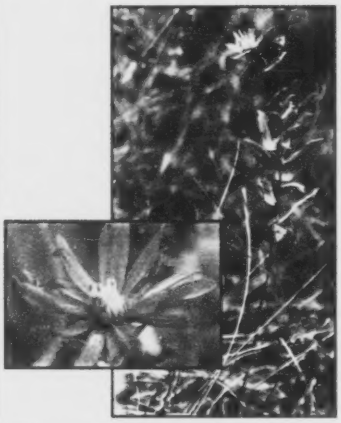


Figure 6. The distribution of swamp saxifrage (*Saxifraga pensylvanica*) in Manitoba.

Western Silvery Aster (*Symphyotrichum sericeum*)

G5, N2, S2

Western silvery aster (family Asteraceae) is a distinctive, late summer herbaceous perennial that grows to a height of 30 to 70 cm. Plants are characterized by several sparsely branched, brittle stems arising from a swollen woody rootstock. The lance-shaped leaves are densely silky-silvery hairy. Most lower leaves die and fall off by the time flowering occurs. Flowers appear from early August to mid-September and are violet to pink in colour.



Western silvery aster is widespread in central North America from Texas to Canada. In Canada it occurs in Manitoba from the US border to northeast of Winnipeg and at two locations in northwestern Ontario. In Manitoba, western silvery aster grows in dry prairies and openings in bur oak/trembling aspen woodlands (Punter and Ford 1999). It typically grows on gravelly or sandy, well drained, calcareous soil. Populations persist in relatively undisturbed grasslands as well as disturbed sites such as roadside ditches and adjacent to gravel pits.

Status & Threats

Western silvery aster is listed as Threatened under the Manitoba *Endangered Species Act*. The species is also listed as Threatened under Canada's *Species at Risk Act*. Overall it is considered apparently secure in the United States and globally by NatureServe (2005).

There are currently 17 extant occurrences of western silvery aster known in Manitoba and four historic or extirpated occurrences (Fig. 7). Most of the smaller occurrences are on privately owned land or provincial road allowances maintained by rural municipalities. Larger occurrences are found within Bird's Hill Provincial Park and the RM of Springfield adjacent to the southern boundary of the park. One historic occurrence recorded from Roseau Rapids First Nation was confirmed extant in 2004.

Immediate and potential threats to the species include gravel extraction, residential development, encroachment of woody vegetation, spraying of herbicides and clearing of ditches, conversion of native prairie to agricultural land, recreational activities, invasion by non-native plants, and drought or insect infestations brought on by climate change (National Recovery Strategy, *in prep.*).

Data Collected in 2004

Areas to the south of Birds Hill Provincial Park in the RM of Springfield were visited on September 2. The area occupied by western silvery aster and its population abundance in this area were found to be much greater than previously known. It is now known to occur on portions of five quarter sections owned by the RM of Springfield, several road allowances and two private properties. As there are several active gravel pits on quarter sections where western silvery aster was observed, gravel extraction is an immediate concern in this area. Side-oats grama (*Bouteloua curtipendula*), a provincially rare grass, was also recorded at several sites while surveying for western silvery aster.

On September 8, previously known occurrences within the RM of Franklin were surveyed. Western silvery aster had been previously recorded from both the north and south boundaries of Roseau Rapids Reserve. The northern occurrence was verified extant. Including the road allowances and private land to the north, there were approximately 400 clumps at this occurrence and likely more in the adjacent quarter section to the north-east, which was not surveyed as landowners were not reached for permission to access. No western silvery aster was found within the southern boundary of the Reserve. However, it was found on privately owned land immediately adjacent to the southeastern boundary. Over 500 clumps were estimated to densely cover an area of approximately 3 ha. A 1943 topographic map shows this site as a gravel pit.

Dense western silvery aster on apparent site of old gravel pit

The other occurrence within the RM of Franklin is approximately 2 km north of the north boundary of Roseau Rapids First Nation. There were approximately 100 clumps occurring in road allowances and shrubby prairie openings in the private pasture to the north. The northern half of two quarter sections were searched but apart from the shrubby openings covering approximately half a hectare, almost no stems were observed in the remaining heavily grazed pasture.

Recommendations

Future Research

A standardized methodology for estimating population size is needed. Surveys documenting area of occupancy and estimates of population size are needed, as well, particularly south of Birds Hill Provincial Park. The ability of western silvery aster to naturally recover from disturbances such as gravel extraction should be examined closely by monitoring affected populations. Further searches on private land within the RM of Franklin and within Roseau Rapids First Nation could lead to the expansion of known occurrences and the discovery of new ones.

Management

Information regarding western silvery aster, its legal status, and survey results has been provided to the RM of Springfield and private landowners. A report on western silvery aster and other rare plants that may occur within Roseau Rapids First Nation is in preparation. Cooperation with RM of Franklin staff may result in the development of road allowance maintenance strategies that also help to maintain western silvery aster populations. More detailed information about management techniques that minimize impacts on these populations and that promote maintenance of native prairie should be provided to all landowners and managers. Manitoba and Ontario are currently preparing a National Recovery Strategy for western silvery aster.

Figure 7. The distribution of western silvery aster (*Symphyotrichum sericeum*) in Manitoba.

Western Spiderwort (*Tradescantia occidentalis*)

G5, N1, S1

Western spiderwort (family Commelinaceae) is a perennial, subsucculent herbaceous plant. Roots are both fleshy and succulent. Its stems are up to 60 cm in height. Leaves are green with a whitish bloom, alternate, linear-lanceolate, entire, 6-50 cm in length and 0.2-2.0 cm broad, with sheathing bases. The umbellate inflorescence is subtended by elongate bracts similar to the leaves. Each flower has three pointed petals 7-15 mm long, blue to rose in colour. One flower in each inflorescence opens each day and lasts for only a few hours. The fruit is a capsule with three locules (sections), each locule producing 3-6 oblong seeds 2-4 mm long and yellow to dark brown in colour.

This is a species of active and semi-stabilized sand dune systems. In Manitoba, the species is known from the Routledge and Lauder Sandhills.

Status & Threats

Western spiderwort is listed as Threatened under the Manitoba *Endangered Species Act* and the federal *Species at Risk Act*. The development of a National Recovery Strategy is currently underway. Manitoba's spiderwort populations are disjunct from those in the United States and the rest of Canada. Despite extensive searches, the species has only been recorded from two sand ridges in the Routledge Sandhills and two sand ridges in the Lauder Sandhills.

Much of the available habitat for spiderwort is invaded by leafy spurge. Other threats to this species include encroachment of shrubby vegetation, overgrazing by cattle, petroleum exploration, and off-road vehicle traffic. A portion of the species' habitat is protected from resource extraction, except petroleum, by existing within a protected Wildlife Management Area. Protection also exists via land ownership of a portion of the population by a conservation organization.

Data collected in 2004

Surveys focused on delimiting the area of occupancy of known populations. Sandhills known to support western spiderwort were surveyed on July 14-16 and July 22 (Fig. 8). The boundaries of observed patches were delimited by two surveyors walking the edges of spiderwort patches while tracking movements with GPS-equipped handheld computers. General notes as to habitat, threats, and abundance were taken. Plants occurred on or near partially stabilized sand dunes in the Lauder and Routledge Sandhills. These dunes are normally greater than 5 m in height, and spiderwort is usually most abundant on west-facing slopes. The species was also observed growing on south, east and north-facing slopes, however, as well as on relatively flat sandy blowouts. While plants were most visible when growing on the sparsely vegetated slopes of sand ridges, plants also occur on the wooded, and often steeper, 'backside' in the understory of oak woodland, often with poison ivy. Shaded spiderwort plants were often observed to be concentrated at the top of the slope,

but were occasionally observed up to ¾ of the way downslope as well.

Nearly 86% of the species' known Manitoba area of occupancy (the 'footprint' of plant patches) lie upon private lands (Fig. 9).

Leafy spurge is present at all locations, and aspen encroachment was observed in flatter areas. A relatively dense patch of spiderwort was observed on low dunes in a road allowance which had been cleared of woody vegetation by heavy machinery at some point in the recent past. Open sand occurred here, likely as a result of mechanical disruption. Dense aspen woodland adjacent to this clearing did not contain spiderwort.

A relatively small number of spiderwort stems were in bloom when the Routledge Sandhills was surveyed for smooth goosefoot on August 23rd. This is 4-6 weeks later than the typical peak blooming period in Manitoba.

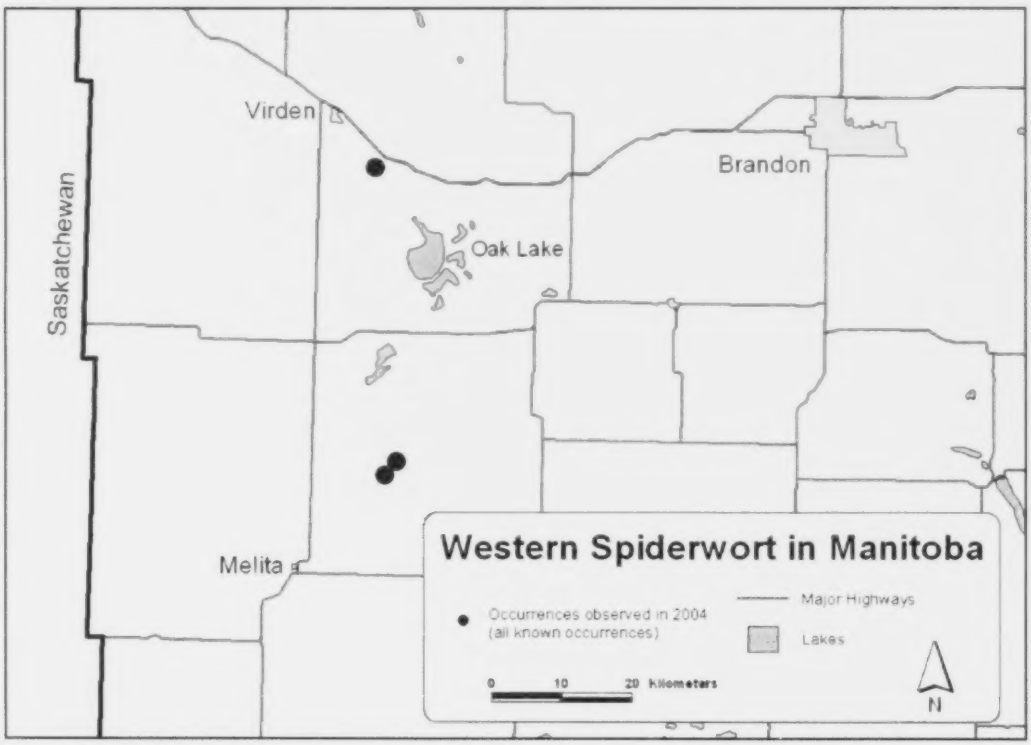


Figure 8. The distribution of western spiderwort (*Tradescantia occidentalis*) in Manitoba.

Recommendations

Future Research

A population estimate for Manitoba's western spiderwort populations has not been made since 2001. Past population estimates are not directly comparable due to differing survey techniques, however. Future surveyors wishing to make population estimates should plan field surveys such that methodology is repeatable and allows the application of statistical trend analysis. Methodology development should be coordinated with other Canadian jurisdictions through the National Recovery Team Chair so that results are comparable

across Canada. Surveys are best carried out early in the day when plants are most easily observed (flowers often close by 1 pm).

In 2004, spiderwort was observed on a private parcel of land into which a sand ridge extends, but surveyors did not have access permission and so the land was not entered. Future surveys should attempt to determine the status of spiderwort on this property. Research of habitat preferences and characteristics may help elucidate the reasons that spiderwort has such a limited range in Manitoba, despite the availability of much seemingly similar sandhill habitat. More research on the most effective methods of leafy spurge control and the species' impacts on spiderwort populations is needed. The use of mechanical brush removal as a means to enhance spiderwort populations seems to be warranted as well.

Management

Landowners should be encouraged to implement or continue management techniques that will help maintain open sand and grasslands. Landowners should be encouraged to work with organizations such as the Manitoba Habitat Heritage Corporation and the Mixed-grass Prairie Stewardship Program to implement these programs. Conservation agreements with landowners will help secure the continued presence of the remarkable diversity of rare and uncommon sand hill species.

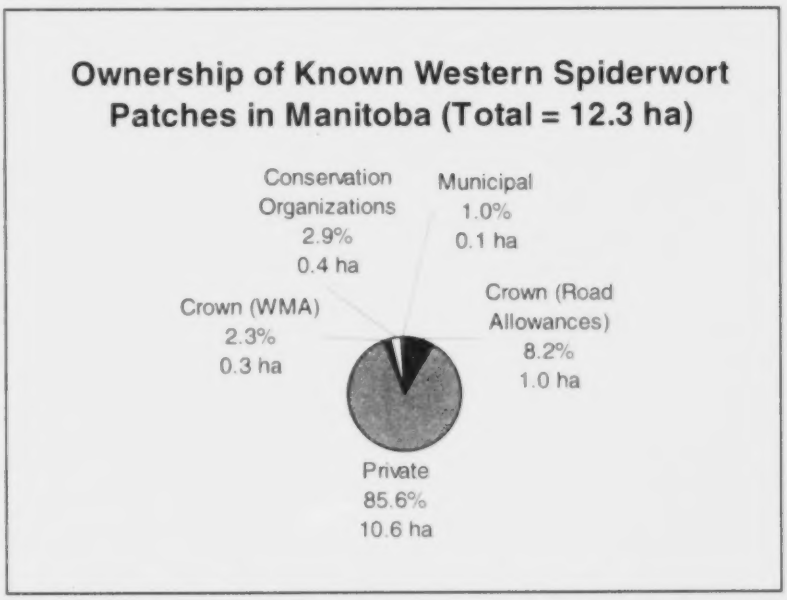

Ownership of Known Western Spiderwort Patches in Manitoba (Total = 12.3 ha)
Conservation Organizations 2.9% 0.4 ha
Municipal 1.0% 0.1 ha
Crown (WMA) 2.3% 0.3 ha
Crown (Road Allowances) 8.2% 1.0 ha
Private 85.6% 10.6 ha

Figure 9. Land ownership of Manitoba western spiderwort patches.

Partially destabilised sand provides habitat for a number of rare species, including nationally rare sand bluestem (*Andropogon hallii*), hairy prairie-clover (*Dalea villosa* var. *villosa*) and smooth goosefoot (*Chenopodium subglabrum*). The full diversity of native plants in sand hill areas can be promoted through management activities that help maintain a mosaic of open sand, grassland and wooded areas. Controlled burns and light grazing help limit the encroachment of aspen into grassland areas and, in combination with the control of leafy spurge populations, can help maintain habitat for both rare and common native species, including western spiderwort. Mechanical brush removal may help stimulate spiderwort growth as well.

Part 2: Other Rare Species Surveyed

Canada wild-ginger (*Asarum canadense*, G5, N5, S3?)

A new occurrence of this species was recorded at Whitemouth Lake when it was encountered incidentally during searches of private lands for Dutchman's breeches on May 19.

Dutchman's breeches (*Dicentra cucullaria*, G5, NNR, S1)

Private land northwest of Whitemouth Lake was searched on May 19, but this species was not observed. The habitat characteristics of these parcels was similar to that of nearby Dutchman's breeches locations. Southern Manitoba had a cool, wet spring and many species emerged or flowered later than usual. Given this fact, along with the proximity of these sites to known populations and their apparently suitable habitat, these properties should be surveyed again.

Eastern yellow stargrass (*Hypoxis hirsuta*, G5, NNR, S3)

Three new occurrences of this species were recorded south of the City of Brandon when it was encountered incidentally during searches of private lands and road allowances for small white lady's-slipper on June 9 and June 16.

Hackberry (*Celtis occidentalis*, G5, NNR, S1)

The species' area of occupancy in the western portion of the Lauder Sandhills was mapped on July 16. Hackberry and western spiderwort co-occur in the western portion of the Lauder Sandhills. As in 2001 (Reimer and Hamel 2002), most trees appeared diseased and in poor condition. No regeneration was observed, and at least 7 dead mature trees were observed. This species was given a status recommendation of Threatened by the Manitoba Endangered Species Advisory Committee in 2003.

Louisiana broomrape (*Orobanche ludoviciana*, G5, NNR, S2)

A new occurrence for this species was recorded while searching for smooth goosefoot in the Routledge Sandhills on August 23. Manitoba Museum botanist Diana Bizecki Robson positively identified a collected specimen.

Narrow-leaved puccoon (*Lithospermum incisum*, G5, NNR, S3)

Two new occurrences of this species were recorded south of the City of Brandon when it was encountered incidentally during searches of road allowances for small white lady's-slipper on June 16. One occurrence consisted of only one plant.

Prairie redroot (*Ceanothus herbaceus*, G5, N3N4, S3)

A new occurrence was discovered in Sandilands Provincial Forest on August 27. The species was encountered incidentally while conducting surveys for ironwood.

Prairie skink (*Eumeces septentrionalis*, G5, N2, S2)

During surveys conducted as part of the Aweme BioBlitz, one individual was encountered in sand prairie on a portion of the Nature Conservancy of Canada's Yellow Quill Prairie Preserve south of Aweme on June 5.

While this species has a status of Special Concern under Canada's *Species at Risk Act*, COSEWIC recommended uplisting the species to Endangered in May 2004. As of publication of this document, the consultation process leading toward a decision to uplist the species under federal law was ongoing.

Sand bluestem (*Andropogon hallii*, G4, N2, S2)

The extent of a known occurrence at the Routledge Sandhills was recorded incidentally while surveying western spiderwort on July 14.

Sensitive fern (*Onoclea sensibilis*, G5, NNR, S3S4)

A new occurrence was discovered near Hunt Lake, in Whiteshell Provincial Park on October 7. The species was encountered incidentally while conducting surveys for ironwood.

Sessile-leaf bellwort (*Uvularia sessilifolia*, G5, NNR, S2)

The extent of a known population of this species at Whitemouth Lake was expanded when the species was encountered incidentally during searches of private lands for Dutchman's breeches on May 19.

Side-oats grama (*Bouteloua curtipendula*, G5, NNR, S2)

A new occurrence of this species was recorded in Spruce Woods Provincial Park on August 25 while conducting smooth goosefoot searches in sand prairie. The extent of a known occurrence in the Birds Hill gravel esker complex was expanded on September 2 when it was incidentally encountered while surveying for western silvery aster on a number of Rural Municipality owned land parcels south of Birds Hill Provincial Park.

Smooth green snake (*Liochlorophis vernalis*, G5, N5, S3S4)

During surveys conducted as part of the Aweme BioBlitz, one individual was encountered in sand prairie on a portion of the Nature Conservancy of Canada's Yellow Quill Prairie Preserve south of Aweme on June 5.

Sprague's pipit (*Anthus spragueii*, G4, N4B, S2S3B, SARA: Threatened)

Two new occurrences were recorded in 2004. During surveys conducted as part of the Aweme BioBlitz, a singing male was encountered on a portion of the Assiniboine Corridor WMA south of Aweme on June 6. A singing male was also recorded in a grassland area near Oak Lake on July 15. This species was given a status recommendation of Threatened by the Manitoba Endangered Species Advisory Committee in 2003.

Part 3: Special Survey and Stewardship Initiatives

Green Frog Surveys in Southeastern Manitoba

Introduction

The green frog (*Rana clamitans*) occurs across northeastern North America from Nova Scotia south to Florida and Texas, and north to Minnesota and southeastern Manitoba. The species is known from 5 locations in Manitoba, all within Nopiming Provincial Park, and is ranked by the Manitoba Conservation Data Centre (CDC) as S2 (provincially rare). The species is considered globally and nationally secure (G5, N5).

Ongoing land use planning exercises within the Department of Conservation, as well as the nomination of a known green frog location within Nopiming Provincial Park as an Ecological Reserve, has resulted in a heightened interest in the range of green frogs in southeastern Manitoba. As CDC field work plans for 2004 already included surveys for a number of rare southeastern plant species, staff felt that conducting limited complementary green frog surveys would be feasible.

Methods

CDC staff consulted with Peter Taylor, a naturalist with years of experience conducting breeding bird surveys in Nopiming and other parts of southeastern Manitoba, and who is also the source of several of the CDC's green frog records. Mr. Taylor's suggestions included surveying in mid-June (peak calling period in Manitoba) and, if possible, surveying between 4 and 7 AM (peak chorus). Prior to field surveys, staff reviewed the calls of frogs likely to be encountered in southeastern Manitoba and recalled them in the field with the use of a handheld computer.

Surveys were planned for June 2004, in conjunction with surveys for provincially rare white water-lilies (*Nymphaea* spp.). Surveying multiple species was felt to be compatible as blooming and calling times overlap in June and white water-lilies and green frogs share a preference for slow moving, relatively small streams, ponds and lake margins.

Potential habitat was identified from orthophotos, park maps, and by sight. With the exception of one canoe-accessed location, all sites were road accessible. At each site the following information was recorded: general habitat characteristics, wind speed (scale of 1-5), presence or absence of rain and any other sounds that may interfere with frog detection, time of day, the amount of time spent listening (normally 5 minutes), the number of surveyors, and approximate temperature.

Results

Surveys occurred on 5 separate days between June 4 and July 3, 2004. Green frogs were listened for at 27 locations in southeastern Manitoba (Fig. 10); but none were heard. Mink frogs (*Rana septentrionalis*), which are provincially uncommon (G5, N5, S3), were heard at 3 locations (Fig. 11), including two locations from which they had not been

previously recorded. Mink frog locations and associated habitat information will be recorded in the CDC's rare species database. Provincially common boreal chorus frogs (*Pseudacris triseriata*) and gray tree frogs (*Hyla versicolor*) were also heard.

Discussion and Recommendations

Observations of habitat characteristics at sites where green frogs have been observed in the past revealed no superficial features differentiating these sites from dozens of other streams, ponds and lakeshores in southeastern Manitoba. Green frog populations in Manitoba are at the northwestern periphery of the species range, and may thus be naturally rare and confined to scattered sites.

Additional surveys that utilize an improved sampling regimen may reveal additional occurrences. The dates and times of the surveys conducted in 2004 were necessarily constrained by the field schedule of the CDC survey crew. As a result, the weather and survey time-of-day were often suboptimal. Wind or rain noticeably interfered with audio detection (wind 3 or greater on a scale of 1-5) at 16 of 27 locations. A desire to survey as many potential sites as possible in the time available meant that only one surveyed location was distant from established roadways. Much suitable habitat likely exists in the backcountry areas of Nopiming, Atikaki, and the north Whiteshell. Future surveys focused on backcountry areas, with enough consecutively blocked time available to compensate for excessively windy and/or rainy days and to allow for early morning surveys on consecutive days, would have a much better probability of detecting new green frog occurrences.

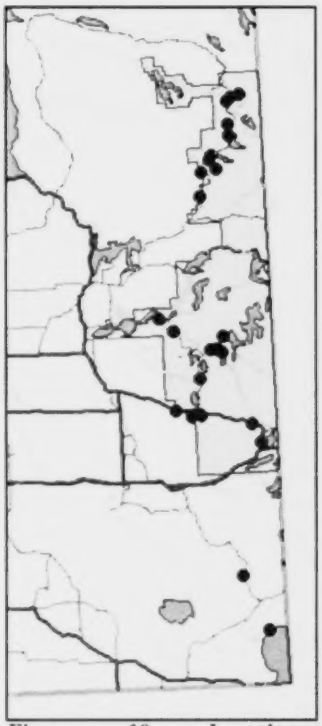


Figure 10. Locations surveyed for green frogs in 2004 (black dots). Whiteshell and Nopiming Provincial Parks are shaded. No green frogs were heard.

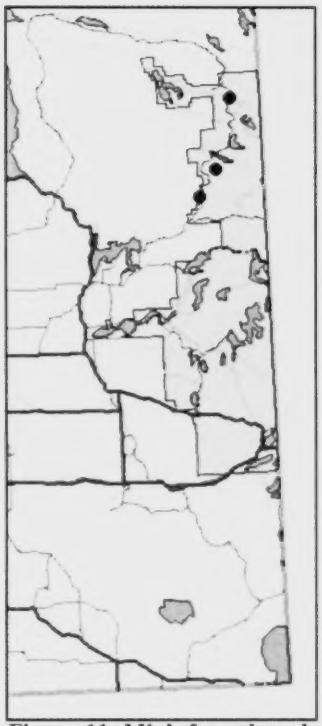


Figure 11. Mink frogs heard in 2004 (black dots). Whiteshell and Nopiming Provincial Parks are shaded.

Surveys of Rare Alvar-like Plant Communities in the Southern Interlake

Alvar ecosystems are characterised by grassland, savannah and sparsely vegetated rock barrens on thin soil over flat dolostone bedrock (pavement) (Reschke et al. 1999). Dolostone (also known as dolomitic limestone) has a neutral to basic pH, is magnesium rich, and is thought to be a chemically altered form of limestone (Gore 2004). A key ecological factor of alvars is an extreme soil moisture regime; while poor site drainage can lead to seasonal flooding, thin soils and exposed rock can lead to nearly complete desiccation in the height of summer (Reschke et al. 1999). Most alvar ecosystems are globally rare, and most North American alvars occur within the Great Lakes basin (Reschke et al. 1999).

Staff of the Manitoba Conservation Data Centre conducted surveys of near-surface dolostone areas in the southern Interlake on 5 separate days between May 28 and October 27, 2004. Despite being well outside of the Great Lakes basin, these areas have a number of biological and edaphic features in common with alvar ecosystems, including near-surface dolostone pavement, characteristic plant species, and a similar disturbance regime.

The objectives of CDC surveys were threefold:

- Survey for the presence of rare plants or plant communities.
- Gauge the regional extent and conservation significance of alvar-like areas in the southern Interlake.
- Gauge the degree of threat to these systems.

Surveys revealed that alvar-like plant communities appear to have an extremely limited range in Manitoba, and are under threat from strip mining associated with planned dolomite extraction. Of five known Manitoba sites, three are under mining claims. Two provincially uncommon species were collected; purple locoweed (*Oxytropis lambertii*) and Porter's chess (*Bromus porteri*).

For more information on alvar surveys in the southern Interlake see the following report, available from the CDC:

Hamel, C. and C. Foster. 2004. Surveys of a Rare Alvar-like Plant Community in Eastern Clematis WMA and Comments on Regional Significance. Manitoba Conservation Data Centre. 14 pp.

Southeastern Manitoba Volunteer Initiatives

The intensive recreational use of portions of southeastern Manitoba, as well as its relatively dense summer cottager population, represents a potential source of local biological knowledge. In 2004, CDC staff attempted to document new rare species occurrences through the development of communication materials that encouraged local residents and resource users to report observations of rare species. A number of large, showy, and relatively easy to identify species were chosen in order to increase interest and the likelihood of quality second-hand reports. One initiative involved three rare tree species and another involved white water-lilies.

Rare Trees of Southeastern Manitoba

Southeastern Manitoba encompasses the range of three provincially rare tree species; large-tooth aspen (*Populus grandidentata*, G5, NNR, S1S2), eastern white pine (*Pinus strobus*, G5, N5, S2), and ironwood (*Ostrya virginiana*, G5, NNR, S2). Posters and handouts were distributed to park and campground offices, and Whiteshell business owners with the cooperation of the Whiteshell Business Association. The poster can be viewed at: http://web2.gov.mb.ca/conservation/cdc/requests/pdf/raretrees.pdf

Responses were received from seven people.

Large-tooth aspen was reported from six locations. Two were verified on Oct. 7, two were already known but were visited and mapped more accurately, one is a verified report but has yet to be mapped during a site visit, and one was a false report based on white aspen (*Populus alba*), an introduced species. One additional occurrence was found by CDC staff in early May of 2004. The Manitoba range of large-tooth aspen is presented in Figure 12.

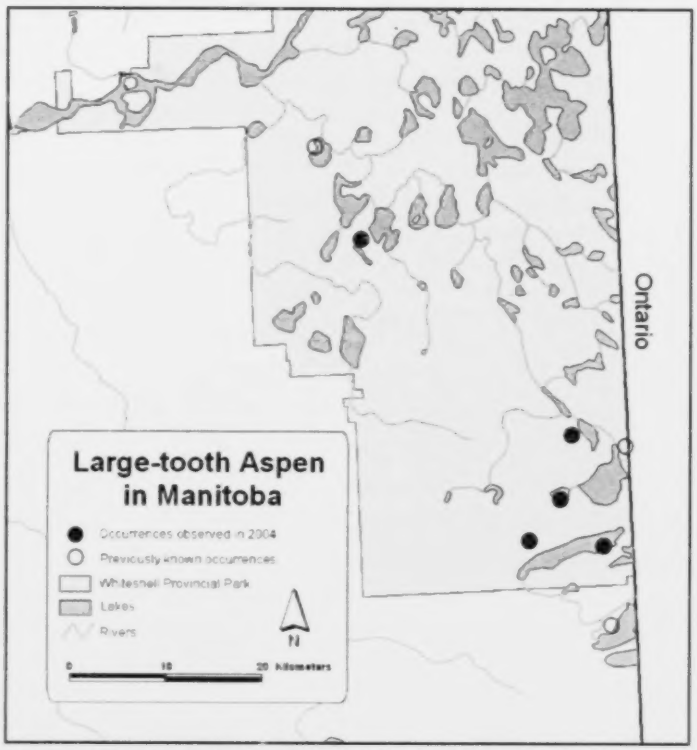


Figure 12. The distribution of large-tooth aspen (*Populus grandidenta*) in Manitoba.

White pine was reported from three locations. Two were already known but one new report was verified on Oct.7 at Caddy Lake.

Ironwood was reported from four locations. Three reports were false and based on sightings of elm, hawthorn, and a willow with insect galls. One report was from a remote location and has yet to be verified.

Rare Water-lilies of Southeastern Manitoba

Three water-lily species of interest occur in southeastern Manitoba; fragrant water-lily (*Nymphaea odorata*, G5, N5, S2), pygmy water-lily (*Nymphaea tetragona*, G5, N5, S2), and dwarf water-lily (*Nymphaea leibergii*, G5, N5, S4). Both the fragrant and pygmy water-lilies are considered rare. The dwarf water-lily is believed to be the most common. However, the dwarf and pygmy water-lilies are very similar and were previously considered to be one species (Wiersema 1997). In addition, the dwarf and fragrant water-lily have been known to hybridize (Flora of North America Editorial Committee 1997). The discovery of co-existent water-lily populations would provide useful study opportunities. In an attempt to find new occurrences via volunteer reports an article was published in the Whiteshell Echo. This article can be viewed at: http://web2.gov.mb.ca/conservation/cdc/requests/pdf/rare_waterlilies.pdf

Two responses were received. One respondent reported seeing lots of fragrant water-lily along several canoe routes within the park but none of the smaller white water-lilies were observed. The other respondent reported pygmy water-lily from two locations just outside the south west corner of the park. These reports have yet to be visited and mapped.

Discussion and Recommendations

The Whiteshell Cottagers Association is very enthusiastic about both the rare tree and rare water-lily initiatives. At the request of the Environment Committee chairman additional handouts have been printed and provided for the Whiteshell Cottagers Association Annual General meeting.

The use of posters, handouts, and articles served as an effective means of raising awareness of the presence of rare plant species in southeastern Manitoba. Unsuitable weather conditions seem to have limited the flowering times and locations of white water-lilies, and this may have contributed to the limited number of voluntary reports received. Response to the rare tree posters and handouts was significant, and important new information about the status and distribution of large-tooth aspen and eastern white pine was gained.

The successes of the rare species reporting materials produced for southeastern Manitoba should be built upon. Residents and resource users in southeastern Manitoba should be encouraged to continue their participation in the reporting of rare species occurrences, and more effort should be made to reach patrons of Nopiming and Atikaki Provincial Parks. The use of posters, handouts, and local media should be considered for other areas of Manitoba as well.

Part 4: Partnerships

Manitoba Museum

CDC staff cooperated with the Manitoba Museum's botanist in planning surveys for smooth goosefoot. Diana Bizecki Robson is also the author of an upcoming COSEWIC status report update on the species. At the request of Museum staff, CDC staff also collected fungi, moss, and lichen samples from a variety of rare species survey locations. These samples will be added to the Museum's herbarium.

Nature Conservancy of Canada

Staff cooperated with NCC staff throughout the year. The location of potential land acquisition sites was reviewed for rare species using GIS. Cooperation continued on a landscape-scale conservation area planning exercise for the Tallgrass Aspen Parkland, an area that contains Manitoba's highest concentration of rare plant species and a number of legally protected species.

Manitoba Habitat Heritage Corporation

Staff cooperated with MHHC staff throughout the year. The location of potential land acquisition sites was reviewed for rare species using GIS. MHHC staff utilized species at risk occurrence data from the CDC's database to help identify priority sites for the negotiation of legal conservation agreements with landowners.

Roseau River Anishinaabe First Nation

Staff from the CDC met with a councillor from Roseau River Anishinaabe First Nation in 2004 to discuss surveys for western silvery aster within the boundaries of Roseau Rapids Reserve. Interest in the preservation of rare species and cooperation with the CDC was expressed by the councillor and a report on our findings was requested. In addition, the CDC will be providing information on rare plants found in the area as an amateur botanist resides on the Reserve. Great plains ladies'-tresses (*Spiranthes magnicamporum*), Culver's-root (*Veronicastrum virginicum*) and Riddell's goldenrod (*Solidago riddellii*) have all been recorded immediately adjacent to Roseau Rapids Reserve. Great plains ladies'-tresses is listed as provincially Endangered. Both Culver's-root and Riddell's goldenrod are listed as provincially Threatened. Riddell's goldenrod has also been listed under Canada's *Species at Risk Act* as a species of Special Concern. In addition, the provincially and nationally Endangered small white lady's-slipper has been recorded within 2 km of the Roseau Rapids Reserve.

Turtle Mountain Conservation District and RM of Morton

In the summer of 2004 the Turtle Mountain Conservation District hired two summer students to survey undeveloped/underdeveloped road allowances within the RM of Morton that have been designated for protection as Conservation Corridors. The CDC provided the students with information about rare and uncommon plants and birds that

have been recorded in the area. Many of the records were 20 to 60 year old. Two data sheets were returned; one for piping plover (*Charadrius melodus*) which is believed to be a false report based on a sighting of semipalmated plover (*Charadrius semipalmatus*), and one for hairy sweet cicely (*Osmorhiza claytonia*) which remains to be verified.

Whiteshell Cottagers Association

The Whiteshell Cottagers Association, in particular the Environment Committee, has shown a great deal of interest in receiving and disseminating information provided by the CDC. In addition to a white water-lily article published in the Whiteshell Echo, they included a list of rare and uncommon plants found in the Whiteshell area along with CDC contact information. Manitoba's Species at Risk Fact Sheets and copies of both the water-lily and rare trees extension materials were provided for the Annual General Meeting of the Whiteshell Cottagers Association. Links to the CDC are also included on their website.

Native Orchid Conservation Inc.

Native Orchid Conservation Inc. (NOCI) continues to send data on rare and uncommon plants to the CDC. Notable species reported in 2004 were pygmy water-lily (*Nymphaea tetragona*) and least mouse-tail (*Myosurus minimus*). The pygmy water-lily was reported as a result of the article published in the Whitesehell Echo. Least mousetail is a rare plant that was included in the information provided to the Turtle Mountian Conservation District. Five specimens are known from extreme southwestern and southcentral Manitoba, all collected prior to 1953. It was also reported by Marshall (1983) from the Pembina Hills. Although it was not found within the RM of Morton, NOCI found it in the interlake region, which is the most northeastern site known for this species.

Least mouse-tail

Stewardship Recommendations

Although stewardship requirements vary, several land management issues are common to most rare plant species in Manitoba. The actions of land managers affect the survival of rare plant populations and the habitats in which they grow. As such, stewardship plans must be produced with input from landowners and managers, especially on private lands. Stewardship programs that inform landowners of the presence of rare species on their lands, present options for management and conservation, and aid landowners in implementing their chosen options will have the greatest benefit to rare species.

The following actions will promote stewardship and survival of many plant species at risk in Manitoba:

- Increase awareness of rare species in Manitoba and related information. Manitoba's Species at Risk fact sheets, brochures explaining the CDC, the federal *Species at Risk Act* and Conservation Agreements, and other media help raise awareness and inform land owners. Opportunities for formal and informal communication with land owners and managers, local governments, public and other interested parties should be utilized whenever possible. In all cases, the importance of sound stewardship by land managers should be acknowledged and/or stressed.

- Continue to encourage public participation in the reporting of rare species occurrences. The successes of the rare species reporting materials produced for southeastern Manitoba should be built upon. Continued use of posters, handouts, and local media, expansion to other areas of Manitoba and other suitable rare species should be considered. While these programs are primarily intended to increase the CDC's knowledge of Manitoba's biodiversity, they have the added benefit of raising local awareness of the presence of rare species in general.

- Establish regional road allowance management plans. A large proportion of rare plant populations occur in remnant native habitat in road allowances and are threatened by maintenance activities such as mowing, spraying of herbicides, drainage improvement, and trenching or digging activities conducted by municipalities or utility companies. In most cases, road allowance maintenance staff are not aware of the presence of these occurrences. Contact protocol and mitigation recommendations, produced in cooperation with Manitoba Highways and Transportation and rural municipalities, are required for the continued existence of many rare species populations.

- Establish a rare species stewardship resource centre. A variety of organizations offer support to landowners in the form of conservation agreements and stewardship programs such as rotational grazing, prescribed burns and control of invasive species. The assortment of stewardship options and conservation organizations that offer landowner support has lead to duplication of effort and confusion for landowners and land managers. The establishment of one contact point for landowners, acting as a clearinghouse of stewardship information, would simplify the first steps toward expanded stewardship of species at risk for landowners, help focus and reduce duplication of services among conservation organizations, and ultimately increase the number of landowners participating in stewardship activities.

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Appendix: Definitions of Conservation Status Ranks

Adapted from the Manitoba CDC website, 1998

Species are evaluated and ranked by the Conservation Data Centre on the basis of their range-wide (global - G) status, nation-wide (national – N) status, and province-wide (subnational - S) status according to a standardised procedure used by all Conservation Data Centres and Natural Heritage Programs. These ranks are used to determine protection and data collection priorities and are revised as new information becomes available.

For each level of distribution—global, national, and provincial—species are assigned a numeric rank ranging from 1 (very rare) to 5 (demonstrably secure). This reflects the species' relative endangerment and is based primarily on the number of occurrences of that species globally, nationally, or within the province. However, other information, such as date of collection, degree of habitat threat, geographic distribution patterns and population size and trends, is considered when assigning a rank. The numbers of occurrences listed below are suggestions, not absolute criteria. For example, the Green Frog (*Rana clamitans*) is ranked G5, S2. That is, globally the species is abundant and secure, while in Manitoba it is rare and may be vulnerable to extirpation.

Rank	
1	Very rare throughout its range or in the province (5 or fewer occurrences, or very few remaining individuals). May be especially vulnerable to extirpation.
2	Rare throughout its range or in the province (6 to 20 occurrences). May be vulnerable to extirpation.
3	Uncommon throughout its range or in the province (21 to 100 occurrences).
4	Widespread, abundant, and apparently secure throughout its range or in the province, with many occurrences, but the element is of long-term concern (> 100 occurrences).
5	Demonstrably widespread, abundant, and secure throughout its range or in the province, and essentially irradicable under present conditions.
U	Possibly in peril, but status uncertain; more information needed.
H	Historically known; may be rediscovered.
X	Believed to be extinct; historical records only, continue search.
NR	Not ranked. Conservation status not yet assessed.

Other Heritage Codes

Code	
G#G# N#N# S#S#	Numeric range rank: A range between two of the numeric ranks. Denotes range of uncertainty about the exact rarity of the species.

Subrank

Code	
T	Rank for subspecific taxon (subspecies, variety, or population); appended to the global rank for the full species, e.g. G4T3.

Qualifiers

Code	
A	Accidental in the province; including species (usually birds or butterflies) recorded very infrequently, hundreds or thousands of kilometres outside their usual range.
B	Breeding status of a migratory species. Example: S1B,SZN - breeding occurrences for the species are ranked S1 (critically imperilled) in the province, nonbreeding occurrences are not ranked in the province.
E	An exotic established in the province; may be native in nearby regions.
HYB	Element represents a hybrid of species.
N	Non-breeding status of a migratory species. Example: S1B,SZN - breeding occurrences for the species are ranked S1 (critically imperilled) in the province, nonbreeding occurrences are not ranked in the province.
P	Indicates the element may potentially occur in the province.
Q	Taxonomic questions or problems involved, more information needed; appended to the global rank.
R	Reported in the province, but lacking documentation that would provide a basis for either accepting or rejecting the report.
T	Rank for subspecific taxon (subspecies, variety, or population); appended to the global rank for the full species.
Z	Ranking not applicable.
#	A modifier to SX or SH; the species has been reintroduced but the population is not yet established.
?	Inexact or uncertain; for numeric ranks, denotes imprecision.